WHAT IS CLAIMED IS:

1. A method for planarizing a surface of an electrically conductive layer on a substrate, where the surface of the electrically conductive layer has relatively high features and relatively low features, the method comprising the steps of:

applying a viscous material to the surface of the electrically conductive layer, whereby at least the relatively low features are covered by the viscous material,

immersing the substrate in an electrically conductive solution,

applying an electrical potential between the electrically conductive layer and an electrode within the electrically conductive solution, whereby reaction kinetics favor erosion of the electrically conductive layer, and

agitating the electrically conductive solution, thereby selectively uncovering at least features that are relatively high, and thereby preferentially planarizing at least the features that are relatively high.

2. The method of claim 1 wherein the viscous material is a liquid.

3. The method of claim 1 wherein the viscous material is electrically conductive.

4. The method of claim 1 wherein the viscous material is glycerol.

5. The method of claim 1 wherein the viscous material is a silicon oil.

6. The method of claim 1 wherein the viscous material has a viscosity of at least about five centipoise.

7. The method of claim 1 wherein the viscous material is the electrically conductive solution.

8. The method of claim 1 wherein the viscous material is applied by dipping.

9. The method of claim 1 wherein the viscous material is applied by swabbing.

10. The method of claim 1 wherein the viscous material is spun on to the surface of the electrically conductive layer.

11. The method of claim 1 wherein the electrically conductive layer is copper.

12. The method of claim 1 wherein the substrate is formed of silicon.

13. The method of claim 1 wherein the agitation is produced by stirring the electrically conductive solution.

14. The method of claim 1, further comprising the steps of:
increasing the agitation as the relatively high features are planarized, thereby selectively uncovering features that are relatively low, and
thereby planarizing the features that are relatively low.

15. The method of claim 14, wherein planarization of the features that are relatively high is accomplished at a first current density and planarization of the features that are relatively low is accomplished at a second current density.

16. The method of claim 15, wherein the first current density is greater than the second current density.

17. A method for planarizing a surface of an electrically conductive layer on a substrate, where the surface of the electrically conductive layer has features that are at least one of relatively closely spaced, relatively broadly spaced, relatively high, and relatively low, the method comprising the steps of:
applying a viscous material to the surface of the electrically conductive layer, whereby at least the relatively low features are covered by the viscous material,
immersing the substrate in an electrically conductive solution,
applying an electrical potential between the electrically conductive layer and an electrode within the electrically conductive solution, whereby reaction kinetics favor erosion of the electrically conductive layer,

agitating the electrically conductive solution, thereby selectively uncovering at least features that are relatively high, and thereby preferentially planarizing at least the features that are relatively high, and preferentially protecting features that are both relatively low and relatively broad,

increasing the agitation as the relatively high features are planarized, thereby selectively uncovering features that are relatively low, and

thereby planarizing the features that are relatively low.

18. The method of claim 17 wherein the electrically conductive layer is copper.

19. A method for planarizing a surface of a copper layer on a substrate, where the surface of the copper layer has relatively high features and relatively low features, the method comprising the steps of:

immersing the substrate in an electrically conductive solution containing glycerol, whereby at least the relatively low features are covered by the glycerol,

applying an electrical potential between the copper layer and an electrode within the electrically conductive solution, whereby reaction kinetics favor erosion of the copper layer, and

agitating the electrically conductive solution, thereby selectively uncovering at least features that are relatively high, and thereby preferentially planarizing at least the features that are relatively high.

20. The method of claim 19 wherein the agitation is produced by stirring the electrically conductive solution.